Educational Programs in Climate and Environmental Studies

2024-25

Shoolini University of Biotechnology and Management Sciences,

Bajhol, Solan, Himachal Pradesh-173229

EE 3.1 & EE 3.2 Courses on Climate Science and Environmental Sustainability

Shoolini University is deeply committed to developing environmentally responsible leaders through specialized academic programs in climate science, environmental sustainability, and renewable energy. Shoolini University offers a diverse and interdisciplinary portfolio of **56 courses** focused on climate science and environmental sustainability across multiple disciplines, including Environmental Sciences, Agriculture, Engineering, and Economics. These courses are curated by the **Centre of Energy and Environmental Sustainability (CEEST)**, ensuring a structured and focused approach to sustainability education. Core courses such as Environmental Science, Environmental Engineering, and Environmental Biotechnology provide strong foundational and applied knowledge, while specialized subjects like Global Climate Change and Environmental Laws address policy and mitigation aspects. The curriculum also integrates region-specific and practical components, including Himalayan sustainability, renewable energy, waste management, and biodiversity conservation. Overall, the programs are designed to develop scientific understanding, technical skills, and problem-solving abilities to address contemporary environmental challenges and support sustainable development.
Below is the list attached -

S.no	Name	Course Code	Credits
1	Sustainable Energy Solutions	CSU2020	3
2	Climate crisis: Issues, Impacts & Adaptations	CSU1429	3
3	Sustainable Tourism in the Himalayas	CSU655	3
4	Ecology and Environmental History	CSU715	3
5	Sustainable Leadership for Environmental Happiness	CSU2034	3
6	Environmental Laws	LLB204	5
7	Sustainable Food Packaging	CSU1172	3
8	Environmental Engineering	CSU153	4
9	Environmental Science	noc24_hs160	3
10	Biological aspects of Environment	CSU1061	4
11	Sustainable Agriculture & Technology	CSU1986	2
12	Environment Science	CSU2057	3
13	Thallophytes and their Sustainable Utilisation	CSU1176	4
14	Sustainable Water Supply Management	CSU1173	3
15	Biotechnological solutions for Environmental Challenges	CSU1431	3
16	Principles of Sustainable Finance	CSU1712	3
17	Environmental Economics	CSU1778	3
18	Our Survival: Biodiversity & Sustainability	CSU637	3
19	ESG (Environmental, Social & Governance)	CSU1754	3
20	Introductory Agro meteorology & Climate Change	AGR223	2
21	Environmental sciences Theory	BP206T	2
22	Our Environment	CSU902	3
23	United Nations Sustainable Development Goals (UN SDGs)	noc25_hs81	3
24	Human Values for Sustainability	CSU2094	3
25	Food Microbiology for safe and sustainable food system	noc25_ag14	2
26	Environmental Law	LLM(CON)205	4
27	Ecology and Environment	noc23ge33	3
28	Environmental Impact Assessment	CSU788	3
29	Renewable Energy and Green Technology	EST311	3
30	Environmental Biology	ENV501	3
31	Global Climate Change	ENV521	3

32	Environmental Toxicology	ENV523	3
33	Industrial Waste Management	ENV536	3
34	Agriculture and Environment	ENV534	3
35	Ground Water Hydrology	ESU027	3
36	Geographic Information System	ESU028	3
37	Farming System & Sustainable Agriculture	AGR222	1
38	Biotechnology in Environment Management	CSU1067	3
39	Environmental Psychology	CSU1622	3
40	Environmental Laws	BALLB502	3
41	Environmental Studies and Disaster Management	ENV211	3
42	Ecological Aspects of Environmental Degradation	BTC516	3
43	Environmental Biotechnology	BTT506	3
44	Engineering for Environmental Protection	CSU1095	3
45	Environmental Biotechnology and Bioremediation	CSU1349	3
46	Environmental Microbiology and Bioremediation	CSU1355	3
47	Intermediary Principles of Energy metabolism	CSU1123	4
48	Conservation of Energy	CSU1078	3
49	Electric Energy Consumption	CSU1093	3
50	Foundation for Energy Systems Technology	EN502	3
51	Bio- Energy and Biofuels	EN504	3
52	Energy Generation from Waste	EN515	3
53	High Energy Physics	PHY535(c)	3
54	Solar Energy	PHY535(e)	3
55	Materials and Energy Devices	PHY603(H)	3
56	Energy Efficiency, Acoustics and Daylighting in Building	noc24-ce47	3

EE 3.3 Academic Programs in Climate and Sustainability

Shoolini University provides a comprehensive portfolio of interdisciplinary programs centered on sustainability and clean energy. These include **B.Tech** and **M.Tech in Renewable Energy Technology**, a **Ph.D. in Energy Science & Technology**, along with **M.Sc. Agriculture (Soil Science & Agriculture Chemistry** and **Ph.D. programs in Environmental Sciences**. The programs are thoughtfully designed to build strong academic foundations while fostering practical expertise in climate science, renewable energy systems, and environmental sustainability. With a focus on innovation, research-driven learning, and real-world applications, the curriculum empowers students to address pressing global environmental challenges and contribute meaningfully to sustainable development.

1. B.Tech in Renewable Energy

Program Duration: 4 years, Eight Semester

Program Overview:

The B.Tech in Renewable Energy is designed to develop skilled professionals capable of addressing global energy challenges through sustainable and innovative solutions. The program adopts a multidisciplinary approach, integrating core engineering principles with specialized

knowledge of renewable energy technologies such as solar, wind, hydro, and bioenergy.

Key Outcomes of the Program:

- Develop the ability to undertake research and innovation to solve complex energy-related challenges using sustainable technologies.
- Build strong communication and analytical skills for effective technical writing, presentation, and documentation.
- Gain advanced knowledge of energy science and allied systems, comparable to higher-level academic standards.
- Acquire practical expertise in the design, installation, operation, and management of renewable energy systems.
- Critically evaluate the environmental, economic, and social impacts of energy technologies in the context of sustainable development.

Career Prospects:

Graduates of this program are well-prepared for diverse roles in renewable energy project design, energy auditing, policy planning, consultancy, and research. The program equips students to become future leaders and innovators driving the global transition toward clean, sustainable, and low-carbon energy systems.

2. M.Tech in Energy Technology

Program Duration: 2 Years, Four Semesters

Program Overview:

The M.Tech in Energy Technology is designed to equip students with advanced knowledge and technical expertise to address global challenges related to climate change and energy security. The program focuses on recent advancements in energy systems and promotes the development of sustainable and efficient energy solutions through a research-driven and interdisciplinary approach.

Key Outcomes of the Program:

- Develop in-depth understanding of advanced energy technologies and systems to address climate and energy-related challenges.
- Gain specialized training in research and policy development across diverse energy domains, including energy efficiency, solar and wind energy, bioenergy, biofuels, nuclear energy, hydropower, cogeneration, and waste heat recovery.
- Build the capability to design, analyze, and implement innovative and sustainable energy solutions.

- Enhance skills required for contributing to academia, research organizations, and the global energy industry.
- Promote long-term reduction of greenhouse gas emissions and support climate change mitigation strategies.

Career Prospects:

Graduates of this program are well-prepared for careers in research and development, policy planning, consultancy, and leadership roles within the renewable and sustainable energy sectors, both in India and internationally.

3. Ph.D. in Energy Science & Technology

Program Duration: Minimum of 6 Semesters

Program Overview:

The Ph.D. in Energy Science & Technology, offered by the Centre of Excellence in Energy Science and Technology (CEEST), is designed to develop independent researchers and future leaders in the field of sustainable energy. The program emphasizes high-quality, original research supported by rigorous academic standards and an interdisciplinary approach. Scholars are encouraged to undertake innovative research addressing critical challenges in energy systems, sustainability, and climate change. As part of the program requirements, candidates are expected to publish their work in high-impact scientific journals and successfully defend their thesis before a panel of expert reviewers, ensuring academic excellence and global relevance.

Career Prospects:

The program prepares graduates for advanced roles in academia, research institutions, think tanks, and the energy industry. It equips scholars with the expertise needed to contribute to cutting-edge innovations, policy development, and sustainable solutions in energy science and technology.

4. M.Sc. Agriculture (Soil Science & Agricultural Chemistry)

Program Duration: 2 Years (4 Semesters)

Program Overview:

The M.Sc. in Agriculture (Soil Science & Agricultural Chemistry) is a postgraduate program designed to provide in-depth knowledge of soil systems, nutrient management, and sustainable agricultural practices. The program focuses on understanding soil fertility, soil chemistry, plant–soil interactions, and the role of soils in environmental sustainability and climate resilience. It equips students with analytical, technical, and research skills required to

address challenges related to soil health, agricultural productivity, and sustainable land management.

Key Outcomes of the Program:

• Develop a strong foundation in soil science, soil chemistry, and nutrient dynamics.

• Build technical expertise in soil analysis, fertility management, and sustainable agriculture practices.

• Gain proficiency in modern tools such as soil testing techniques, GIS, and precision agriculture.

• Enhance research, analytical thinking, and problem-solving skills for soil and environmental management.

• Understand the role of soil systems in climate change mitigation and sustainable development.

Career Prospects:

Graduates of this program can pursue careers in agricultural research, soil testing laboratories, fertilizer and agrochemical industries, and sustainability consulting. Opportunities are available in government departments such as agriculture and soil conservation agencies, as well as in research institutions, agribusiness firms, and environmental organizations. Graduates may also advance into academia, research, and doctoral studies.

5. Ph.D. in Environmental Sciences

Program Duration: Minimum of 6 Semesters

Program Overview:

The Ph.D. in Environmental Sciences at Shoolini University is a research-intensive program designed to develop independent scholars capable of addressing complex environmental challenges through innovative and interdisciplinary research. The program integrates scientific inquiry with practical applications across key areas such as ecology, climate change, pollution control, environmental policy, and sustainable development.

Key Outcomes of the Program:

- Develop advanced research skills to address critical environmental issues.
- Foster innovation and interdisciplinary approaches in environmental science.
- Contribute to policy development, environmental management, and technological advancements in sustainability.
- Encourage publication in high-impact journals and active participation in national and international research forums.

- Prepare scholars for leadership roles in academia, research, and the environmental sector.

Career Prospects:

Graduates of this program can pursue careers in higher education, research institutions, government and regulatory bodies, environmental consultants, international organizations, and industries focused on sustainability and environmental compliance. The program equips scholars to contribute effectively to global environmental solutions and policy frameworks.

6. Ph.D. in Disaster Management

Program Duration: Minimum of 6 Semesters

Program Overview:

The Ph.D. in Disaster Management is a research-focused program designed to develop advanced knowledge and expertise in disaster risk reduction, climate resilience, and sustainable development. The program emphasizes interdisciplinary research in areas such as disaster preparedness, mitigation strategies, emergency response systems, and the impact of climate change on natural and human-induced disasters. It equips scholars with analytical, policy-oriented, and research skills to address complex disaster-related challenges at local, national, and global levels.

Key Outcomes of the Program:

• Develop advanced research capabilities in disaster risk assessment and management.
• Gain expertise in climate change adaptation, resilience planning, and mitigation strategies.
• Build proficiency in policy analysis, disaster governance, and emergency response frameworks.
• Strengthen analytical, critical thinking, and interdisciplinary research skills.
• Contribute to innovative solutions for sustainable and resilient communities.

Career Prospects:

Graduates can pursue careers in academia, advanced research, and policy advisory roles. Opportunities exist in government bodies such as disaster management authorities, environmental agencies, and planning commissions, as well as in international organizations, NGOs, and humanitarian agencies. The program also prepares scholars for leadership roles in disaster risk reduction, climate resilience planning, and sustainable development initiatives.

Conclusion

Shoolini University demonstrates a strong and comprehensive commitment to climate science and environmental sustainability through its well-structured academic programs and diverse course offerings. By integrating sustainability across disciplines such as engineering, environmental sciences, agriculture, economics, and biotechnology, the university ensures that students gain both theoretical knowledge and practical expertise to address real-word environmental challenges. The combination of specialized degree programs, interdisciplinary courses, and research-driven learning fosters innovation, critical thinking, and problem-solving skills among students. Emphasis on areas such as renewable energy, climate change mitigation, environmental protection, and sustainable resource management reflects the university's alignment with global sustainability goals.

Overall, Shoolini University has successfully embedded sustainability into its academic framework, preparing future leaders, researchers, and professionals who are capable of contributing effectively to environmental conservation and the transition toward a sustainable and low-carbon future.